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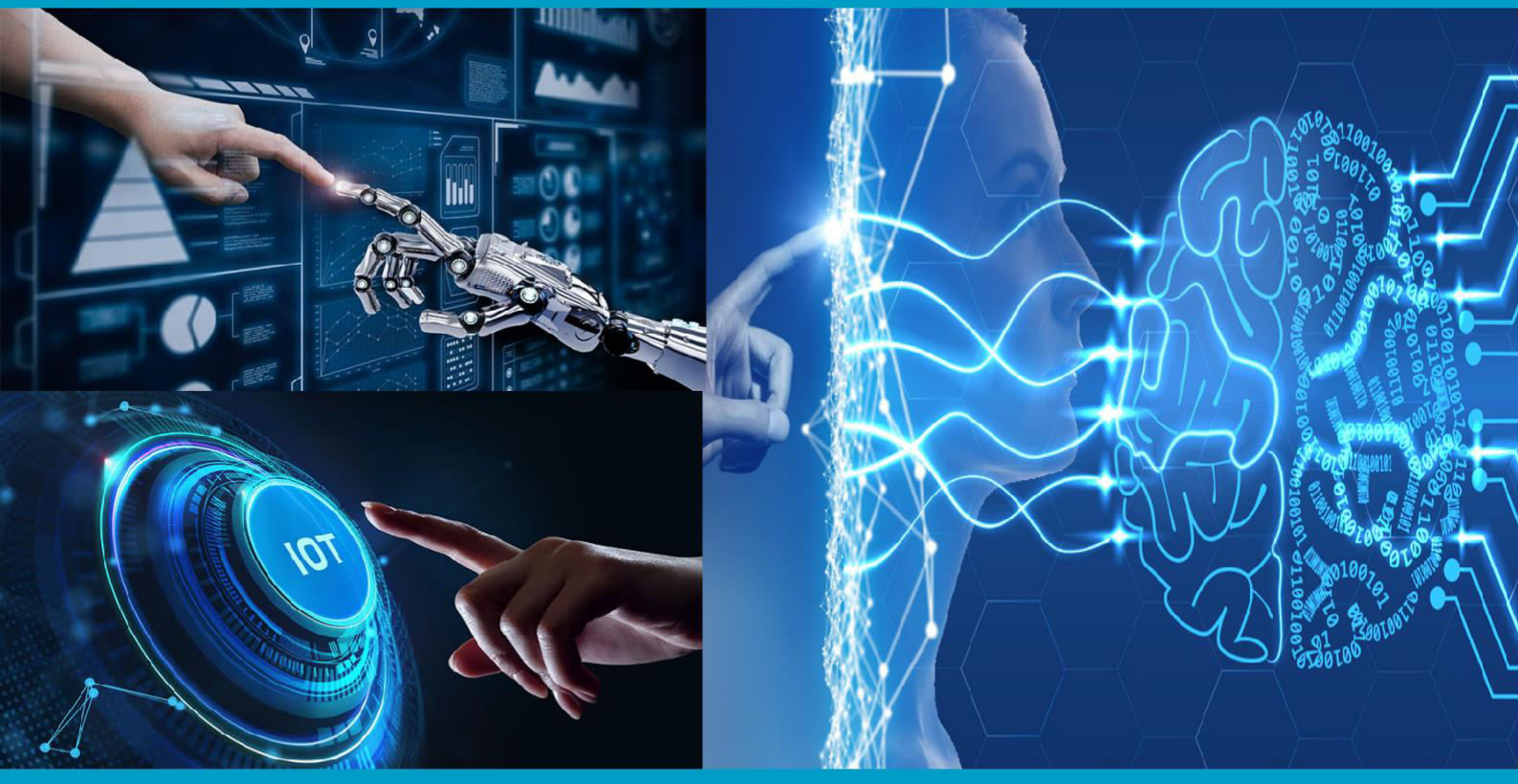

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A Review on Blackspot Safety Assessment and Rectification

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ABSTRACT: India's road network is second biggest. Morth plans to build 60,000km of road in the next five years, or 40km/day. Quality road infrastructure is essential for India's continued growth and development. People and things move more efficiently and quickly. With these dynamic changes in the economy, road transport infrastructure development, and motorization, road traffic accidents have become a more serious issue in India. Safety assessment using sustainable safety principles may reduce traffic injuries and fatalities. This evaluation says a road should have a recognized design and predictable alignment so drivers know how to act and what to anticipate from others to avoid collisions.Safety evaluation includes exploring and examining dark spots to uncover problems that might cause accidents or injuries. Blackspot is a 500m section of National Highway where 5 (Fatal and Grievous) traffic accidents or 10 deaths occurred in the previous 3 years, according to MoRTH. MoRTH has prioritized 789 black areas on national roadways depending on the number of deaths. Tamilnadu had 14% of the country's traffic accidents in 2018 and 789 blackspots. This study describes blackspot correction on NH-45 between Chennai and Villupuram via data collecting, analysis, results, and mitigation methods.

KEYWORDS: blackspot correction, Quality Road infrastructure, India's road network

I. INTRODUCTION

With the rapid development of our national economy, the issue of traffic safety becomes increasingly prominent, and has attracted widespread attention. The road traffic crashes have become a major cause of ill health. As per world Health organisation report, the number of deaths on the world's roads remains unacceptably high with 1.35 million people dying each year. The number of road traffic deaths continues to climb and has remained fairly constant at around 18 deaths per 100,000 populations over last 15 years. Road traffic injury is the 8th leading cause of death for people of all ages.

Road accidents in India kill almost 1.5 Lakh people annually. Accordingly, India accounts for almost 11% of the accident-related deaths in the World. The number of 4, 67,044 accidents and 1, 51,417 deaths in 2018 translate into an average of 1,280 accidents and 415 deaths every day and nearly 53 accidents and 17 deaths every hour. The road safety situation in India is worsening. Accidents, fatalities and casualties have been increasing dramatically over last 20 years.A road is viewed secure when solely a few or in the first-rate case, no accident happens. MoRTH has identified about 789 black spots across the national highways in the country and has accorded priority to each of the black spots based on the number of fatalities. Out of all spots identified location three locations are tabulated with priority based upon the number of fatalities during Year 2017, 2018 and 2019

To ensure the safety on highways it is must to bring down the number of accidents and the fatalities by rectification of blackspots. Blackspot rectification is a process which includes thorough analysis of accidents data, site inspection, and review of geometry, structures, drainage conditions and most important traffic characteristics. This paper deals in methodology of blackspot rectification, accident analysis method, traffic studies, site inspection techniques pertaining to blackspots and specific recommendations measures.

II. METHODOLOGY

The methodology followed for this safety assessment has been as follows:

- Detailed visual survey of the entire stretch, with reference to the CAD drawings of the same.
- Identification of problem areas over the stretch, supported by illustrations.
- Recommendations for safety countermeasures for the unsafe designs.

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Task methodology followed for blackspots rectification is shown in Figure 1. Team visited all Blackspots and collected traffic and topographic details from PIU, whereas extracted the accident data from website of Ministry. Data have been analysed to evolve safety issues to identify matching solutions and countermeasures.

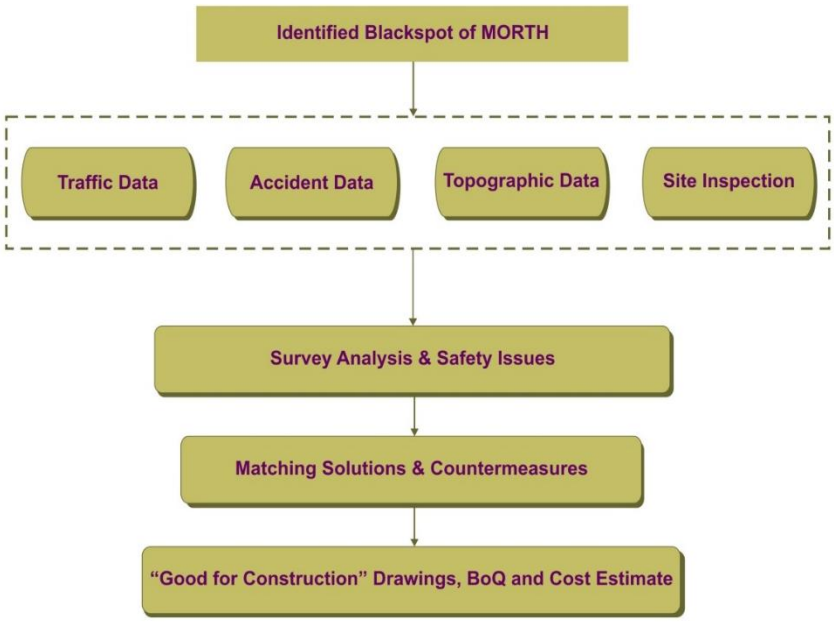

Figure 1: Task Methodology

III. ASSESSMENT AREA DESCRIPTION

3.1 BLACKSPOT AT MAHINDRA WORLD CITY JUNCTION ON NH-45

The identified assessment location is located on NH-45, which is a four-arm junction. The main road is the national highway (NH-45) and traversing along north-south direction from Chennai to Villupuram. This is a four-lane divided carriageway with paved shoulders. As the national highway orientation is along north-south direction, the side roads are along east and west directions. A collector road coming from Mahindra World city on east side and another is intersecting from the west connects NH-45 leading to Chettipunyam, which makes the location to operate as a 4-legged junction. The identified Junction on NH-45 is shown in **Figure 2** and its latitude and longitude in Google Map are 12 o 44'34.16'N and 79o 59'31.51" E respectively. **Figure 3**shows photograph of identified assessment area.

- Northern arm leads to Chennai/Tambaram. This facility has four lanes with divided carriageway and paved shoulders on either side;
- Southern arm leads to Tindivanam/Villupuram. This is a four lane facility with divided carriageway and paved shoulders on either side;
- Eastern arm leads to Mahindra World City. This is a four-lane facility with divided carriageway and paved shoulders on either side; and
- Western arm leads to Chettipunyam. This facility is a two lane carriageway with width of about 7.0m.

The following tasks wereperformedattheblackspotlocationduringsite visit,

- Conducted a local enquiry from local people and police to gain background onthetype ofcrashesandexistingsafetyissues;
- Appreciatedtrafficflowpatternatthejunction;
- Identified overall safety issues by observing the road user behaviour;
- Identifiedsafetyissuesaffectingvulnerableroadusers;

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- Identifiedgeometricdeficiencies;
- Identifiedpossiblepotentialsolutions;and
- Appreciated constraints in implementation of identified draft countermeasures.

Figure 2: Identified Assessment Location on NH-45

Figure 3: Photograph of Location

This junction has three major arms with a minor fourth arm with slightly staggered geometry. The town roads are connecting to NH-45 with a small offset and the eastern arm from Mahindra World City meets the NH at a skew. The junction is operating with a signal. Since no designated/marked crossing is available and with wide open area at the junction, pedestrians have difficulty crossing the NH and are exposed to high speed through traffic of NH. Mahindra world city, a significant traffic generator is located on eastern arm of the junction. There are commercial activities along the national highway approaches and also along the western side road of the junction. Bus bays with bus shelters are present on both sides of the NH on the northern arm of the junction.

3.2 DATA COLLECTION

All related data has been collected to develop counter measures for the identified assessment area on NH-45.

- Road accident data
- Turning movement traffic count data of 24 hours
- Pedestrian movement count data of 24 hours; and
- Topographic survey data covering 500m on either side of the blackspot location.

IV. CONCLUSION

Based on the analysis of accident and traffic data as well as the findings of the causal analysis, it becomes evident that the identified locations on NH-45 require a set of safety improvement measures. All these recommendations for

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countermeasures and a modified design have been developed for the junction as shown above in each blackspot locations. Necessary actions should be taken accordingly to improve the design standard and to mitigate the potential safety problems in future operations, that can occur due to unsafe design of road. Self-explaining roads lead road users to act in a way that is anticipated by road planners and designers, leading to low accident rates. A variety of strategies for directly influencing road user actions, including education, advertisement and compliance are available in addition to road design.

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